

PATENT ABSTRACTS OF JAPAN

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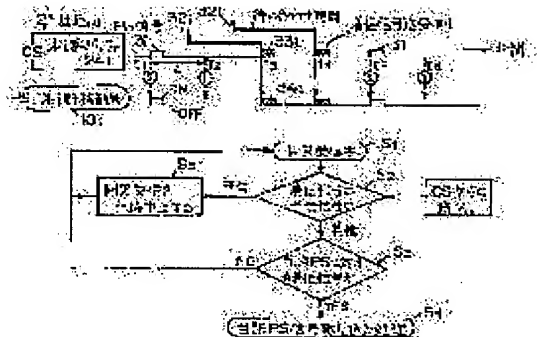
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(54) INTERMITTED RECEPTION METHOD FOR MOBILE COMMUNICATION AND THE METHOD FOR MOBILE STATION

(57)Abstract:

PROBLEM TO BE SOLVED: To effectively execute battery saving for a mobile station.

SOLUTION: When there is no incoming signal in a i-th group buffer 24i, a base station transmits a premonitory signal 31 at incoming signal transmitting timing. A mobile station 10i belonging to the i-th group receiving the signal 31 aborts intermittent reception only by frequency indicated by the signal 31 or previously determined frequency, e.g. once in this case.



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CLAIMS

[Claim(s)]

[Claim 1] If a mobile station is divided into two or more groups and a terminating signal reaches a base transceiver station from a network side Said base transceiver station accumulates said terminating signal in the buffer of said classification concerned to carry out. Said each mobile station which transmits shifting the terminating signal of these classification buffer in time to said each group, and belongs to an applicable group In the intermittent receiving approach of the mobile communication which carries out intermittent reception of said terminating signal which sets fixed period spacing in the group which belongs, and is transmitted to it If a terminating signal does not exist in the buffer of the classification of said base transceiver station concerned, a preliminary announcement signal will be transmitted. Said mobile station which received said preliminary announcement signal during intermittent reception is the intermittent receiving approach of the mobile communication characterized by stopping intermittent reception to the receiving timing according to said preliminary announcement signal, or the timing defined beforehand.

[Claim 2] If a mobile station is divided into two or more groups and a terminating signal reaches a base transceiver station from a network side Said base transceiver station accumulates said terminating signal in the buffer of said classification concerned to carry out. Said each mobile station which transmits shifting the terminating signal of these classification buffer in time to said each group, and belongs to an applicable group In the intermittent receiving approach of the mobile communication which carries out intermittent reception of said terminating signal which sets fixed period spacing in the group which belongs, and is transmitted to it If said terminating signal exists in the classification buffer concerned in case said each group is further divided into subgroup and said base transceiver station transmits said terminating signal of the group concerned to the timing of intermittent reception Give the classification buffer signal which shows subgroup numerical queuing order of the waiting terminating signal for transmission to said terminating signal, and it transmits. The mobile station which received said terminating signal during intermittent reception checks whether if there is nothing, said waiting terminating signal for transmission of said subgroup to which the mobile station concerned belongs to the classification buffer concerned is included in said classification buffer signal with the terminating signal over the mobile station concerned. If said waiting terminating signal for transmission of said subgroup is included, from the queuing sequence Up to the timing of a transmitting schedule of transmitting the waiting terminating signal for transmission from said base transceiver station It is the intermittent receiving approach of the mobile communication characterized by stopping intermittent reception, and only the number of the waiting terminating signals for transmission of said classification buffer signal stopping intermittent reception when the waiting terminating signal for transmission of said subgroup with which the mobile station concerned belongs is not included.

[Claim 3] For said mobile station which transmitted the preliminary announcement signal when a terminating signal did not exist in the buffer of the classification concerned in the intermittent

receiving approach of claim 2, and received said preliminary announcement signal during intermittent reception, said base transceiver station is the intermittent receiving approach of the mobile communication characterized by stopping intermittent reception to the receiving timing beforehand defined to the receiving timing according to said preliminary announcement signal.

[Claim 4] The intermittent receiving approach of the mobile station which will be characterized by stopping intermittent reception to the receiving timing according to the preliminary announcement signal, or the receiving timing decided beforehand in the intermittent receiving approach of the mobile station which carries out intermittent reception of the terminating signal transmitted from a base transceiver station a fixed period to the group to which a local station belongs the period if a preliminary announcement signal is received during the above-mentioned intermittent reception.

[Claim 5] In the intermittent receiving approach of the mobile station which carries out intermittent reception of the terminating signal transmitted from a base transceiver station a fixed period to the group to which a local station belongs the period If the classification buffer signal added to the above-mentioned terminating signal during the above-mentioned intermittent reception is received If detection with the waiting subgroup for transmission to which the local station in the classification buffer signal belongs, and the sequence of the waiting for the transmission is performed and this is detected If the subgroup to which intermittent reception is stopped to the timing to which the terminating signal of the detected local station subgroup is transmitted based on the waiting sequence for transmission of the detected subgroup, and a local station belongs is not detected The intermittent receiving approach of a mobile station that only the number of the waiting subgroups for transmission which carried out [above-mentioned] detection is characterized by stopping intermittent reception.

[Claim 6] The intermittent receiving approach of the mobile station according to claim 5 which will be characterized by stopping intermittent reception to the receiving timing according to the preliminary announcement signal, or the receiving timing decided beforehand in the intermittent receiving approach of claim 5 if a preliminary announcement signal is received during the above-mentioned intermittent reception.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the mobile station intermittent receiving approach for awaiting and lessening the power consumption of the mobile station of a condition.

[0002]

[Description of the Prior Art] The mobile station 10 consists of a control section 11, the transmitting section 12, and a receive section 13, as shown in drawing 8 , and energization is performed as shown in drawing 10 in a communication link and the waiting receptacle for a terminating signal. That is, although it energizes to all each part 11, 12, and 13 during a

communication link, it awaits and inside always needs energization for a control section 11, it awaits, there is no need for 13 inner receive section of always energizing, and intermittent reception is performed. That is, this intermittent reception is the approach of realizing dc-battery saving which always energizes to the receive section 13 of a mobile station, and does not receive to it, but performs intermittent reception by energizing setting fixed spacing which exists in time, and cuts down the power consumption of a mobile station.

[0003] The concrete conventional intermittent receiving approach is based on a mobile station number, such as carrying out count which has used the single bottom figure figure of a mobile station number for all mobile stations (PS), as shown in drawing 9. Two or more groups, #1 group, #2 group ... As it divides into #X group and is shown in drawing 11 A The terminating signal 22 sent to the base transceiver station (CS) 21 from the network side is classification buffer 241 -24x of the group which once belongs via the common buffer 23. It is distributed and accumulated. The intermittent timing switch 251 - 25X It is the intermittent timing switch 251 - 25X repeatedly to become sequential [ON]. The thing used as inner ON, and classification buffer 241 -24x corresponding An arrival-of-the-mail value is transmitted from one. That is, a switch 251 - 25X A terminating signal is transmitted, after waiting for every group until it is set to ON and can pass. and a base station 21 and a mobile station 10 are shown in drawing 11 B — as — buffer 241 -24x of classification of a base station 21 from — mobile station 101 -10x which belong to the group concerned to the timing of the intermittent period tau synchronizing with transmitting a terminating signal The power source of the receive section 13 is set to ON, and intermittent reception is performed.

[0004] the dummy signal which does not have semantics instead of a terminating signal in a base station 21 when there is no terminating signal in classification buffer 24i (i= 1, 2, ... x) — transmitting — mobile station 10i **** — intermittent reception is performed like reception of a terminating signal. It awaits under energization of each part in a mobile station to drawing 10, and the power source ON and OFF condition in inside are shown.

[0005]

[Problem(s) to be Solved by the Invention] Although dc-battery saving is realized by the approach mentioned above in the conventional intermittent reception, a technical problem as shown below also occurs. Drawing 11 c is mobile station 10i which belongs to one group (#i group) with the conventional method. The relation of transmission and reception with a base station 21 is shown. There is no terminating signal of the group (#i group) which belongs, and it is classification buffer (#i group buffer) 24i of a base station 21. Although a dummy signal is transmitted when it is empty, especially when there is little traffic of a terminating signal, it is mobile station 10i. Since intermittent reception of this meaningless dummy signal will continue being carried out continuously, useless power will be consumed.

[0006] Moreover, the traffic of a terminating signal is classification buffer 24i of a base station 21 mostly conversely. When some terminating signals are always accumulated and the condition of the waiting for transmission continues, it is this classification buffer 24i. Information, such as an are recording condition of a terminating signal, is not used at all with the conventional technique. Therefore, in order that the purpose of this invention may receive the meaningless dummy signal at the time of the low traffic of a terminating signal, a mobile station is vainly again to offer the intermittent receiving approach that solve the point using power, and the point of not using the information on the terminating signal of the classification buffer of a base station at the time of the high traffic of a terminating signal, either, and a mobile station controls using power vainly.

[0007]

[Means for Solving the Problem] In invention of claim 1, when the traffic of a terminating signal decreases and there is no terminating signal in a classification buffer, it determines as arbitration how many times intermittent reception is stopped in a base station. Or the signal which it decides [signal] beforehand between the base station and the mobile station, and stops carrying out intermittent reception by the count, That is, an incoming call is accumulated in a classification buffer before the timing which transmits the signal (it is described as a preliminary announcement signal below) which stops intermittent reception to the receiving timing decided in

the base station, or the receiving timing defined beforehand, and transmits a terminating signal again. The mobile station which received the preliminary announcement signal stops that a base station carries out intermittent reception to the timing which transmits a terminating signal again.

[0008] In invention of claim 2, the group of a mobile station is further divided into subgroup, and the signal (it is described as a classification buffer signal below) which doubled information, such as the number of the terminating signals in subgroup numerical order of queuing of the subgroup number of the terminating signal of a classification buffer, and queuing in the group, with the terminating signal is transmitted for every group concerned. The mobile station which received the classification buffer signal stops reception of the intermittent receiving timing which is unrelated according to the transmit timing of the affiliation subgroup obtained from the classification buffer signal.

[0009] In invention of claim 3, in invention of claim 2, when there is no terminating signal in a classification buffer, it determines as arbitration how many times intermittent reception is stopped in a base station. Or decide beforehand between the base station and the mobile station, and the signal (it is described as a preliminary announcement signal below) which stops carrying out intermittent reception by the count is transmitted. Accumulating an incoming call in a classification buffer before the timing which transmits a terminating signal again, the mobile station which received the preliminary announcement signal stops that a base station carries out intermittent reception to the timing which transmits a terminating signal again. That is, invention of claim 3 combines invention with claim 1, and invention of claim 2. If a mobile station receives a preliminary announcement signal during intermittent reception, intermittent reception will be stopped by invention of claim 3 to the receiving timing beforehand defined to the receiving timing according to the preliminary announcement signal.

[0010] In invention of claim 4, during intermittent reception, if the classification buffer signal added to the terminating signal is received, with a mobile station If detection of the waiting subgroup for transmission of the subgroup to which a local station belongs in the classification buffer signal, and its waiting sequence for transmission is performed and this is detected Intermittent reception is stopped to the timing to which the terminating signal of local station subgroup is transmitted next based on the sending-signal sequence of the detected subgroup, and if the waiting subgroup for transmission of the subgroup to which a local station belongs is not detected, only the number of the waiting subgroups for transmission in a classification buffer signal will stop intermittent reception.

[0011] In invention of claim 5, reception of a preliminary announcement signal stops intermittent reception by invention of claim 6 to the receiving timing beforehand decided to the receiving timing according to the preliminary announcement signal.

[0012]

[Embodiment of the Invention] Drawing 1 A is mobile station 10i which belongs to one certain group (the i-th group) in the example of invention of claim 1. The relation of transmission and reception to a power source ON, off-timing, and the transmit timing of the i-th group terminating signal of a base station 21 is shown. At this example, it is the terminating signal transceiver timing t1 to the i-th group. It sets and the terminating signal to the i-th group from a network side is classification buffer 24i. Since there is nothing, a base station 21 transmits the preliminary announcement signal 31 which stops intermittent reception once. time of day t1 Each mobile station 10i of the i-th group which received this preliminary announcement signal 31 The following intermittent receipt time t2 **** — without it sets a power source to ON — intermittent reception — stopping — a base station 21 — timing t2 A terminating signal is not transmitted and received. On the other hand, it is time of day t1. t2 Incoming call 32i [as opposed to the i-th group to between] Classification buffer 24i It is stored and is time of day t2. t3 It is classification buffer 24i in between. Incoming call 32i It is stored. that is, time of day t2 **** — incoming call 32i it is — classification buffer 24i of the i-th group **** — although the terminating signal is stored, as for a base transceiver station 21, a terminating signal is not transmitted as mentioned above.

[0013] Time of day t3 It is classification buffer 24i then. Terminating signal 32i Since it is stored

Time-of-day t_1 - t_2 Terminating signal 32i which came in between Transceiver 33i. It carries out and is mobile station 10i of the i-th group. Based on said preliminary announcement signal 31, 1 time of the following power source ON is omitted, and it is time of day t_3 . The power source of a receive section is turned ON and it is transceiver 34i of a terminating signal. It carries out. The next time of day t_4 It is time of day t_2 and t_3 then. Terminating signal 32i which carried out the call in in between It is transmitted from classification buffer 24i, and is i-th group displacement station 10i. A terminating signal is sent and received.

[0014] Time of day t_5 It is classification buffer 24i then. Since there is no terminating signal, the preliminary announcement signal 31 is transmitted from a base station 21. therefore, the next time of day t_6 **** -- classification buffer 24i transmission and reception of a terminating signal carry out -- not having -- moreover, i-th group displacement station 10i The power source ON of a receive section is stopped. Although it transmitted stopping intermittent reception once from the base transceiver station 21 with the preliminary announcement signal 31 in this example, a base transceiver station 21 is that i-th group displacement station 10i. In consideration of the generating ratio of the receiving usual traffic, according to day ranges and Nighttime, the count of a halt of intermittent reception may be set up and you may transmit. Or the count of an intermittent blind is beforehand decided between the base transceiver station 21 and the mobile station, the mere preliminary announcement signal 31 is transmitted from a base station 21, and only the count decided beforehand stops terminating signal transmission and reception, and if the preliminary announcement signal 31 is received, you may make it, as for a mobile station 10, only said count decided beforehand stop intermittent reception. That is, it is not necessary to include the count of a halt in the preliminary announcement signal 31. That is, the preliminary announcement signal 31 stops intermittent reception with the mobile station which received this to the receiving timing according to the preliminary announcement signal, or the receiving timing defined beforehand.

[0015] Mobile station 10i in this case Operations sequence is shown in drawing 1 B. If it becomes the intermittent receipt time (S1), the input signal from a base station will perform the judgment of a terminating signal or a preliminary announcement signal (S2). In the case of a terminating signal Concerned mobile station 10i To the mobile station concerned if [judge whether it is the receiving terminating signal (S3), to the mobile station concerned, if, perform incorporation processing of the terminating signal (S4), and], it is step S1. It waits for return and the following intermittent receipt time. Step S2 Only the count which sets, and is shown in the preliminary announcement signal 31 when an input signal is the preliminary announcement signal 31, or the count decided beforehand stops intermittent reception, and it is step S1. It returns (S5).

[0016] Next, the example of invention of claim 2 is explained. In this invention, the mobile station belonging to each group is divided into two or more subgroups for every group, respectively. For example, as shown in drawing 2 A, it is the 1st thru/or mobile station 101 - 10x of the x-th group. It divides into the subgroup of a1 - ay, respectively. A predetermined operation can perform this division to a single figure under the number of the mobile station belonging to that group like the case where it divides into the 1st - the x-th group.

[0017] As a base transceiver station 21 shows to drawing 2 B, it is intermittent signal generation section 411 - 41x. Classification buffer 241 - 24x Receive and it is prepared, respectively. Intermittent signal generation section 411 Subgroup information processing section 421 Signal assembly processing section 431 It becomes and is the subgroup information processing section 421. Then The classification buffer 241 concerned Tail end 251, i.e., a switch, The contents of are recording of each stage except a near stage are the signal existence judging section 441. If it is taken out one by one and there is a terminating signal in each stage, it will be the number counter 451 of signals. Counting of 1 is carried out. At the example of illustration, it is the classification buffer 241. Since it is 4, a number of stages is the number counter 451 of signals. Enumerated data Z are 3 at the maximum. Moreover, classification buffer 241 If a terminating signal is in said each stage, it will be the subgroup judging section 461 about the number of the terminating signal of each of that stage to the subgroup. It calculates and asks.

[0018] Signal assembly processing section 431 At this example, they are five steps of

transmission buffers 471. It has. In the 2nd step, it is the number counter 451 of signals. In the example of illustration, 2 is stored for enumerated data Z as the number of the waiting terminating signals for transmission. In the 3rd step classification buffer 241 Switch 251 from --- the subgroup of the terminating signal of the 2nd stage --- the subgroup judging section 461 The 1st subgroup and a1 are stored as a waiting terminating signal for transmission, for example, and it is made the same in the 4th step. from --- classification buffer 241 Switch 251 from --- the subgroup of the terminating signal of the 3rd stage --- In this example, the 3rd subgroup a3 is stored as a waiting terminating signal for transmission, and it is the classification buffer 241. There is no terminating signal in the 4th stage, therefore it is a transmission buffer 471. Nothing is stored in the 5th step.

[0019] The switch 251 concerned When turned ON, it is the classification buffer 241. A terminating signal is a transmission buffer 471 to the stage connected to the switch 251. While it is stored in the first rank, it is this transmission buffer 471. Sequential transmission of the inner rank is carried out. Intermittent signal generation section 412 -41x Intermittent signal generation section 411 It is constituted similarly. moreover, these configurations 441, i.e., the existence judging section of a signal, the number counter 451 of signals, and the subgroup judging section 461 etc. --- it is made to be processed by the so-called CPU usually carrying out decode activation of the program. The number of signals and subgroup number which are transmitted following a terminating signal in **** are described as a classification buffer signal. Moreover, when there is no terminating signal in a classification buffer, a meaningless dummy signal is transmitted.

[0020] The mobile station which received such a terminating signal, or this and a classification buffer signal is processed as shown in drawing 3 . If it becomes the intermittent receipt time (S1), the input signal from a base transceiver station performs the judgment of a terminating signal or a dummy signal (S2), and it judges whether if it is a terminating signal, it is a thing to the mobile station concerned (S3), and if, incorporation processing of the terminating signal will be performed to the mobile station concerned (S4).

[0021] To the mobile station, if [terminating signal / receiving], judge whether the classification buffer signal is added to the terminating signal (S5), and if added It is investigated whether the waiting terminating signal for transmission of subgroup with which the mobile station belongs is included in the classification buffer signal (S6), and if contained Intermittent reception is stopped till the time of day when the terminating signal is transmitted from a base station according to the waiting terminating signal for transmission of what position in the classification buffer signal it was, and it is step S1. It returns (S7).

[0022] On the other hand, if the waiting terminating signal for transmission of the subgroup of the mobile station is not included in the classification buffer signal, only the number Z of the waiting signals for transmission stops intermittent reception, and it is step S1. It returns (S8). Step S5 When the classification buffer signal is not added to a receiving terminating signal, it is step S1. Return and step S2 Also when an input signal is a dummy signal, it is step S1. It returns.

[0023] drawing 4 --- mobile station 10i of the i-th group ***** --- classification buffer 24i of a base station 21 A related example with the condition of each mobile station 10i1, 10 i2, and 10i3 intermittent reception (power sources ON and OFF) is indicated to be the are recording condition and the transmit timing of a terminating signal of a terminating signal to the 1st thru/or the 3rd subgroup a1-a3 of the i-th group. terminating signal transmitting time of day t1 before --- the terminating signal of the 1st subgroup a1, and the terminating signal of the 2nd subgroup a2 --- classification buffer 24i it accumulates --- having --- **** --- therefore --- time of day t1 **** --- a2 is added and transmitted to the terminating signal of the 1st subgroup as a classification buffer signal. time of day t1 Only the mobile station which received the terminating signal over the mobile station concerned in the mobile station 10i1 of the 1st subgroup performs transmission and reception of a base station and a terminating signal. **** --- with the mobile station 10i1 of the 1st subgroup Mobile station 10 i2 of the 2nd and 3rd subgroup and 10i3 get to know that the waiting terminating signal for transmission is one of the 2nd subgroup a2 from a classification buffer signal. The mobile station 10i1 of the 1st subgroup and the 3rd subgroup and

10i3 are, respectively, the next 1 time t2, i.e., time of day. Stopping intermittent reception, mobile station 10 i2 of the 2nd subgroup is time of day t2. Intermittent reception is performed. time of day t2 until it becomes — classification buffer 24i **** — sequential are recording of each terminating signal of the 3rd subgroup, the 1st subgroup, and the 1st subgroup is carried out. [0024] therefore, time of day t2 **** — time of day t1 The terminating signal of the 2nd subgroup used as the waiting for transmission is transmitted, and the waiting subgroups a3, a1, and a1 for transmission are added and transmitted to this as a classification buffer signal. Time of day t2 Only mobile station 10 i2 of the 2nd subgroup does intermittent reception then, and to the mobile station concerned, if, the incorporation is performed. All mobile station 10 i2 of the 2nd subgroup gets to know that the following three waiting terminating signals for transmission are not the things to self-subgroup from a classification buffer signal, and is t4, the next 3 times (number of the waiting terminating signals for transmission Z times) t3, i.e., time of day, and t5. Intermittent reception is stopped.

[0025] The same processing as the following is performed. If the terminating signal of the 2nd subgroup which was the waiting for transmission is transmitted at time of day t10, it is classification buffer 24i. It becomes empty. Therefore, a classification buffer signal is not added to a transmitting terminating signal at this time. Therefore, at the next time of day t11, the mobile station 10i1 to 10i3 of the 1st — the 3rd subgroup carries out intermittent reception altogether. It sets at this time of day t11, and is classification buffer 24i just before that. Since it is empty, the dummy signal 36 is transmitted from a base station 21.

[0026] Invention of claim 3 combines invention of claim 1, and invention of claim 2. As shown in drawing 3 and drawing 4, while dividing into subgroup, adding a classification buffer signal to a terminating signal, transmitting to it and a mobile station's operating corresponding to this, it is classification buffer 24i. If it becomes empty, the preliminary announcement signal 31 explained by drawing 1 will be transmitted instead of the dummy signal 36. The same notation is attached to the part corresponding to drawing 5 with drawing 3, and the procedure of a mobile station is shown. that is, — in this case — step S2 **** — the judgment of a terminating signal or a preliminary announcement signal should do — the count intermittent reception corresponding to that preliminary announcement signal when it was a terminating signal, and became the same processing as drawing 4 and was judged with the preliminary announcement signal — stopping — step S1 It returns (S9).

[0027] Moreover, the relation of drawing 4 in the example of invention of this claim 3, corresponding transmission and reception, and transmitting waiting is shown in drawing 6. That is, although the processing by time of day t10 is completely the same as that of drawing 4 in this example, it is classification buffer 24i at time of day t11. Since it is empty, not the dummy signal 36 but the preliminary announcement signal 31 is transmitted. This preliminary announcement signal 31 may send the information which shows the count which stops intermittent reception like the case of drawing 1, the count of a termination is decided beforehand and the signal which shows that it is only a preliminary announcement signal may be sent. the case where intermittent reception is stopped once by the preliminary announcement signal 31 in this example — it is — time of day t12 — a base station — the transmitting number of a terminating signal and a preliminary announcement signal — not carrying out — moreover, the mobile station 10i1 of the i-th group, 10 i2, and all of 10i3 — intermittent reception is stopped.

[0028] As mentioned above, when adding several Z of the waiting terminating signal for transmission to a classification buffer signal, subgroup can be numbered from the 10th. that is, the waiting terminating signal for transmission in a classification buffer signal by which sequential reception is carried out is meaningless in No. 0 of subgroup (there is no waiting terminating signal for transmission) — that distinction can be carried out. Moreover, there are many subgroups and it is classification buffer 24i. When there are many number of stageses, useless processing can be lost that only the Z should investigate the number of subgroup from the informational degree which shows several Z of the waiting terminating signal for transmission in a classification buffer signal. However, with each mobile station, even if it does not apply the number Z of the waiting terminating signals for transmission to a classification buffer signal in this way, since it investigates whether the thing of self-subgroup is in the waiting terminating signal for

transmission, the count of the intermittent reception which the number of the waiting terminating signals for transmission becomes clear automatically, therefore is stopped can be known.

[0029] Moreover, when not deciding the count of termination intermittent reception beforehand as a preliminary announcement signal in ****, although the information which shows the count of a termination was transmitted by the preliminary announcement signal, the information which shows the time amount which stops intermittent reception may be transmitted. Since the period of intermittent reception is fixed even when transmitting this time amount, the number of the intermittent reception to stop will be decided by that termination time amount, and the timing to which it is substantially the same sending the count of a termination and spending termination time amount, therefore a preliminary announcement signal should receive the terminating signal of the group concerned next will be shown.

[0030] At each example shown in drawing 1 and drawing 6, it is the classification buffer 24i concerned. Although the preliminary announcement signal 31 was transmitted as it is empty, and transmission of the terminating signal over the i-th group was suspended to the transmit timing according to the preliminary announcement signal, a dummy signal may be transmitted as usual. Especially by the preliminary announcement signal, for example, when intermittent reception was stopped 3 times, after the preliminary announcement signal which shows the 3 times was transmitted, When the mobile station belonging to the group concerned has moved to the service zone of the base transceiver station concerned from other zones, the mobile station so that the profits of said preliminary announcement signal may be obtained in a base transceiver station The transmit timing of a terminating signal to the group concerned is [after transmitting said preliminary announcement signal of a 3 times pause] next good to transmit the preliminary announcement signal of a pause twice and to transmit the preliminary announcement signal of a pause once by the transmit timing of the following terminating signal further.

[0031]

[Effect of the Invention] Since the count of invention of claim 1 which transmits a preliminary announcement signal increases and its count which turns OFF the power source of the receive section of a mobile station increases when there is little traffic of a terminating signal, it acts effective in dc-battery saving. When there is much traffic of a terminating signal, in order that invention of claim 2 may be turned for every subgroup of each group by the waiting terminating signal for transmission existing in a classification buffer based on the information on subgroup that this terminating signal belongs and may turn OFF the power source of a receive section finely, it acts effective in dc-battery saving.

[0032] When there is little traffic of a terminating signal, since the count of invention of claim 3 which shuts off the power source which there is the operation same in a place with much traffic of a terminating signal as invention of claim 2 about the same operation as invention of claim 1, stops intermittent reception not much regardless of the traffic of a terminating signal as a result, and is consumed by the receive section of a mobile station increases, it has an operation of dc-battery saving.

Claim 1 thru/or the experimental data about each invention of 3 were acquired by the example computer simulation by simulation.

[0033] A simulation model occurs according to Poisson distribution, is accumulated in a classification buffer, and it waits for "generating of a call" with the buffer of a base station until it is transmitted to a mobile station. Under the present circumstances, it shall be overflowed when all classification buffers are buried. The simulation conditions at the time of data acquisition were made into 0.1-10 average occurrences/second of a call for simulation time amount 3500 seconds for six sizes of subgroup division a6 subgroup and a classification buffer, three power-source OFF numbers, and intermittent receiving period 1 second.

[0034] Drawing 7 A shows the rate of power-source ON (the count of power-source ON by intermittent reception of the conventional technique is set to 1). In order that the conventional method may surely carry out power-source ON to intermittent receiving timing in a receive section, dc-battery saving effectiveness is set to 1 (max) by any cases. Since a power-source off number is 3 in the neighborhood with little traffic, if power-source ON is performed only for 3 and about 1/of traffic of invention of claim 1 increases compared with the conventional method,

effectiveness will fade. With invention of claim 1, conversely, when [of traffic] few, since power-source ON is performed almost each time, invention of claim 2 is not different from the conventional method, but since the signaling information stored in a classification buffer will increase so much if traffic increases, it can reduce the count of part power-source ON. Since it is the approach with which each invention of claims 1 and 2 was doubled, it is not concerned with some of traffic, but effectiveness is acquired, on this condition, about 1/ of the conventional methods is power-source ON of 2, invention of claim 3 ends, and it turns out [of effectiveness] that it is high.

[0035] Drawing 7 B shows average queuing time amount (average of the latency time after a call occurs until it is transmitted from a classification buffer). Since generating of the call in 1 period will increase if traffic increases, it is accumulated in the part buffer and transmitting queuing time amount becomes long. It can be called the best property when invention of the conventional method and claim 2 to which a base station transmits each time is six sizes of a classification buffer. Here, the part queuing time amount became long, and effect has come out of each invention of claims 1 and 3 to which possibility of carrying out transmitting queuing with a power-source OFF 3 batch buffer has a base station after a dummy signal. If traffic becomes high, effect will decrease for the probability for a dummy signal to happen decreasing within sampling time. In any case, it is queuing for 0.4 or less seconds, and it is thought that it is uninfluent.

[0036] Drawing 7 C shows the rate of overflow (rate of overflow from a classification buffer). A buffer will so become easy to be buried if average queuing time amount is long. Therefore, overflow also becomes easy to take place and this property is also linked with the average queuing time amount property. It averages also here, and stops at several% of increment, and it is thought that it is uninfluent.

[0037] As stated above, in invention of claims 1 and 4 Again with stopping intermittent reception for every group using a preliminary announcement signal in invention of claims 2 and 5 The point of not using the information on the terminating signal of the classification buffer of a base station at the time of the high traffic of a terminating signal, either Intermittent reception can be stopped for a group still more finely by dividing a mobile station into subgroup and using a classification buffer signal. In invention of claims 3 and 6, there are claim 1 and effectiveness which controls incorporating each description of each invention of two, stopping intermittent reception regardless of the traffic of a terminating signal, and using power vainly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] A is classification buffer 24i of the i-th group in the example of invention of claim 1. B is drawing showing the related example of intermittent reception of the i-th group displacement station with a terminating signal are recording condition and its transmit timing, and the flow chart showing the procedure of the example of invention of claim 4.

[Drawing 2] Drawing for the explanation to which A re-divides a classification mobile station into subgroup, and B are the block diagrams showing the functional configuration of the base station in invention of claim 2.

[Drawing 3] The flow chart showing the procedure of the example of invention of claim 5.

[Drawing 4] Drawing 1 A in the example of invention of claim 2, and corresponding drawing.

[Drawing 5] The flow chart showing the procedure of the example of invention of claim 6.

[Drawing 6] Drawing 1 A in the example of invention of claim 3, and corresponding drawing.

[Drawing 7] The track record data based on computer simulation are shown, and A is [average queuing time amount and C of the rate of power-source ON and B] the rates of overflow.

[Drawing 8] The block diagram showing the outline configuration of a mobile station.

[Drawing 9] Drawing for explaining a group division of a mobile station.

[Drawing 10] Drawing showing the power source ON in each part of a mobile station, and an OFF condition.

[Drawing 11] Drawing for the block diagram and B which show the functional configuration of classification transmission of the terminating signal of a base station [in / in A / the conventional technique] to explain actuation of intermittent reception, and C are drawings showing the relation between the terminating signal are recording condition of the classification buffer of the i-th group of the conventional technique, the transmit timing of a terminating signal, and the receiving timing of the i-th group displacement station.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

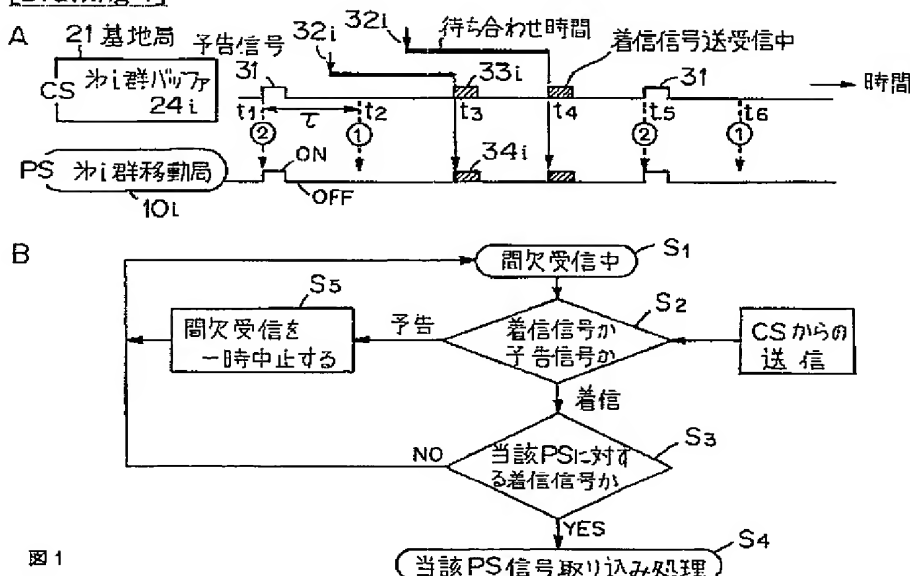
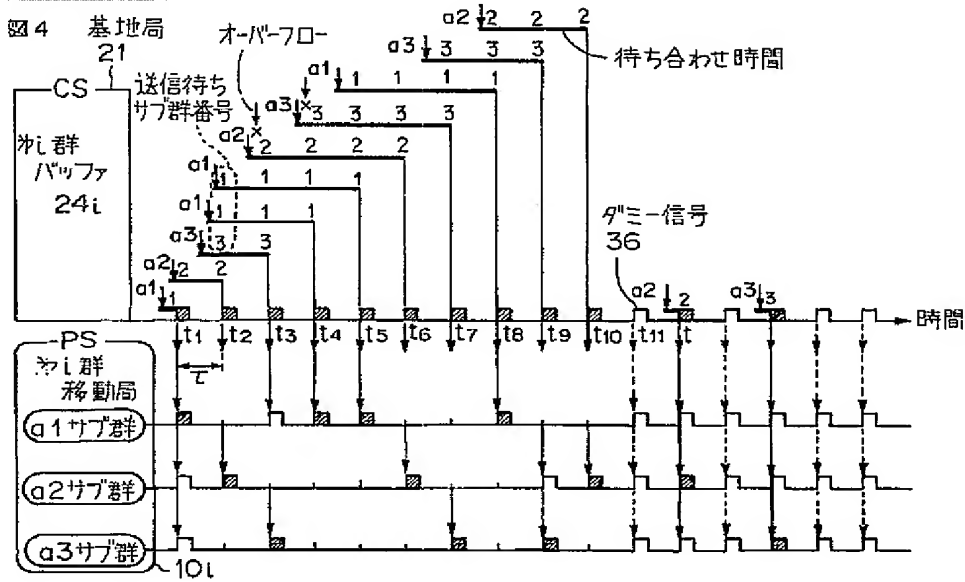


図 1

[Drawing 4]



[Drawing 9]

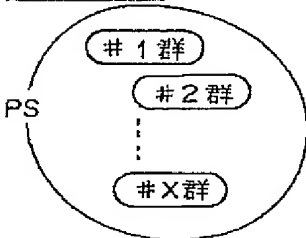
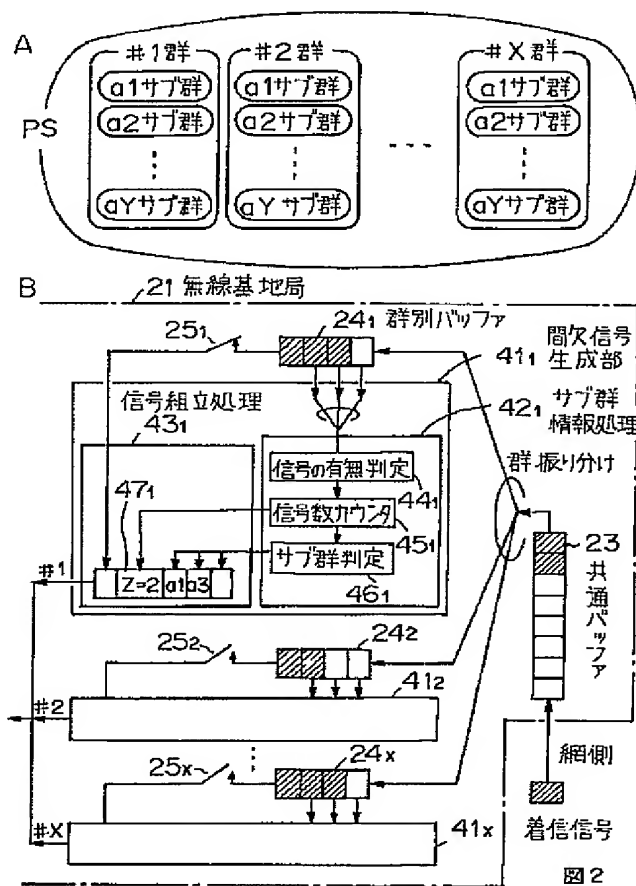


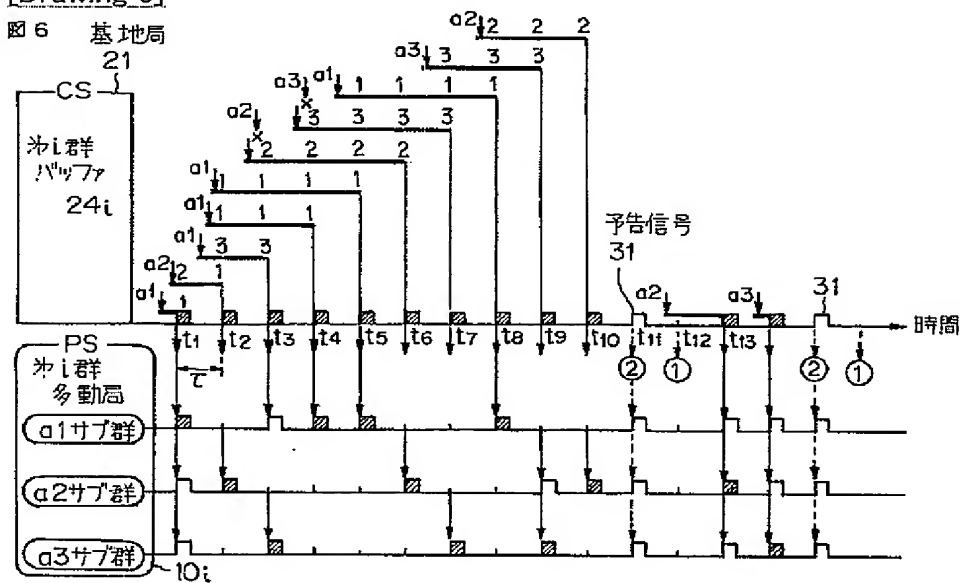
図9

[Drawing 2]



[Drawing 6]

図 6 基地局



[Drawing 7]

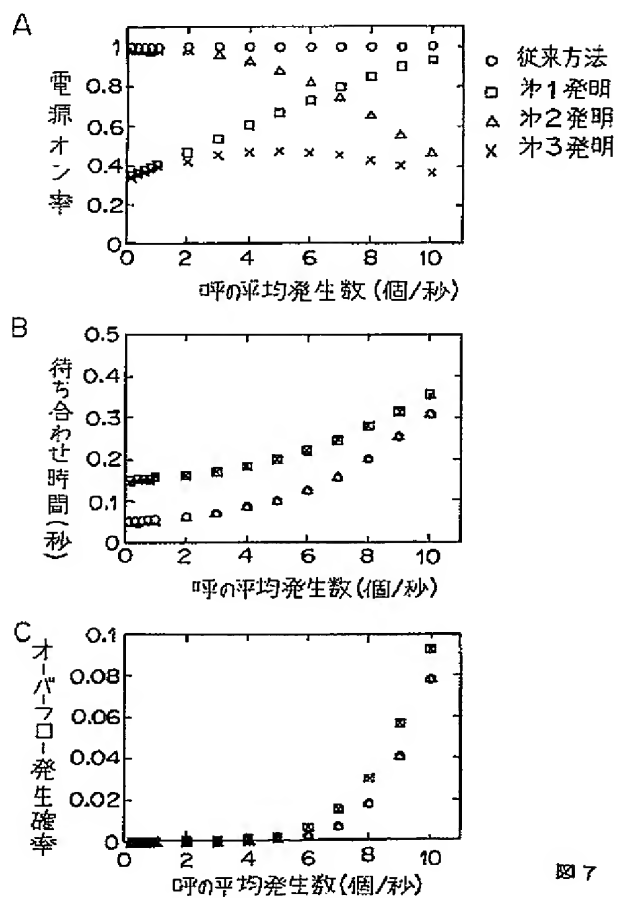


図 7

[Drawing 3]

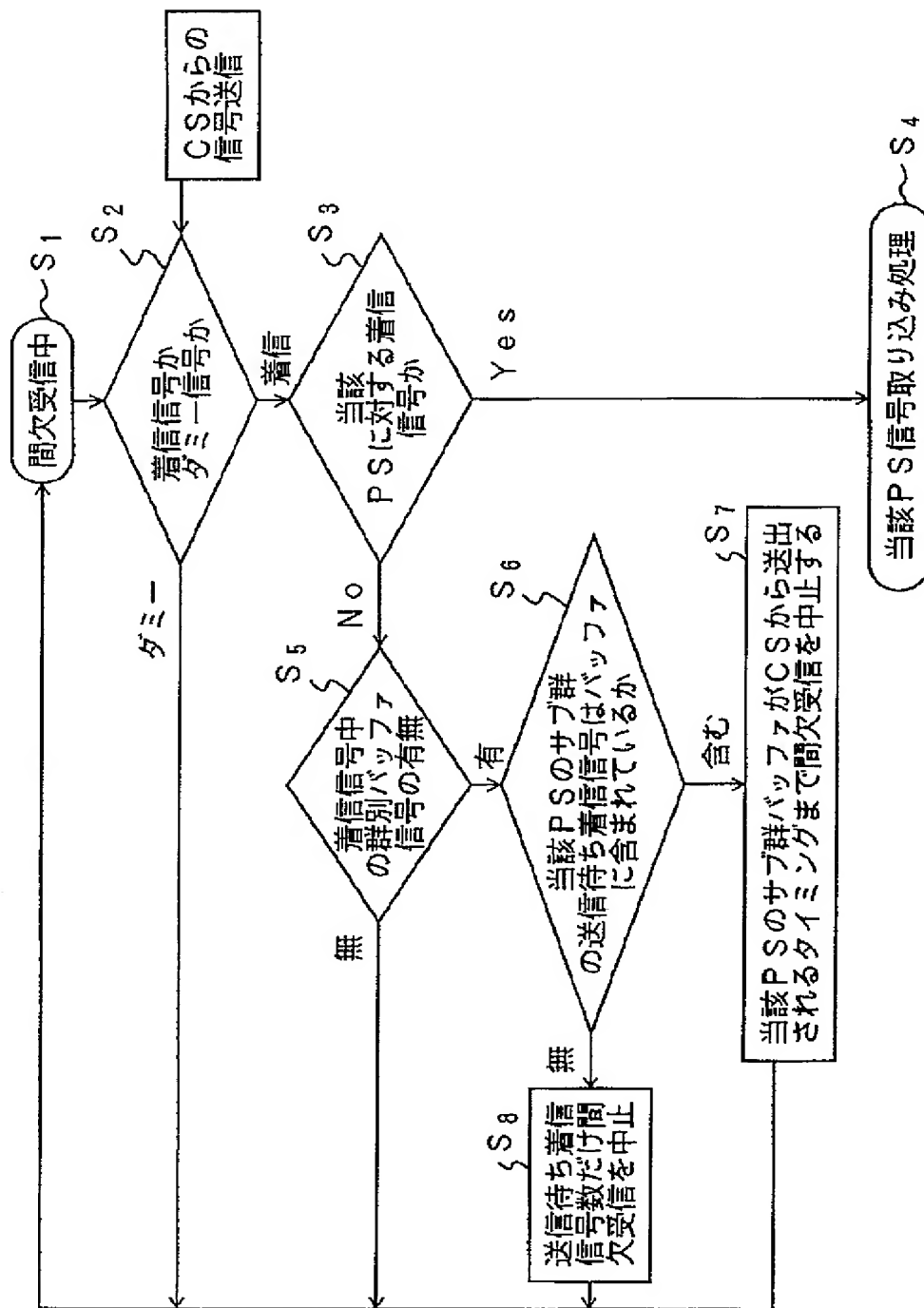


図 3

[Drawing 5]

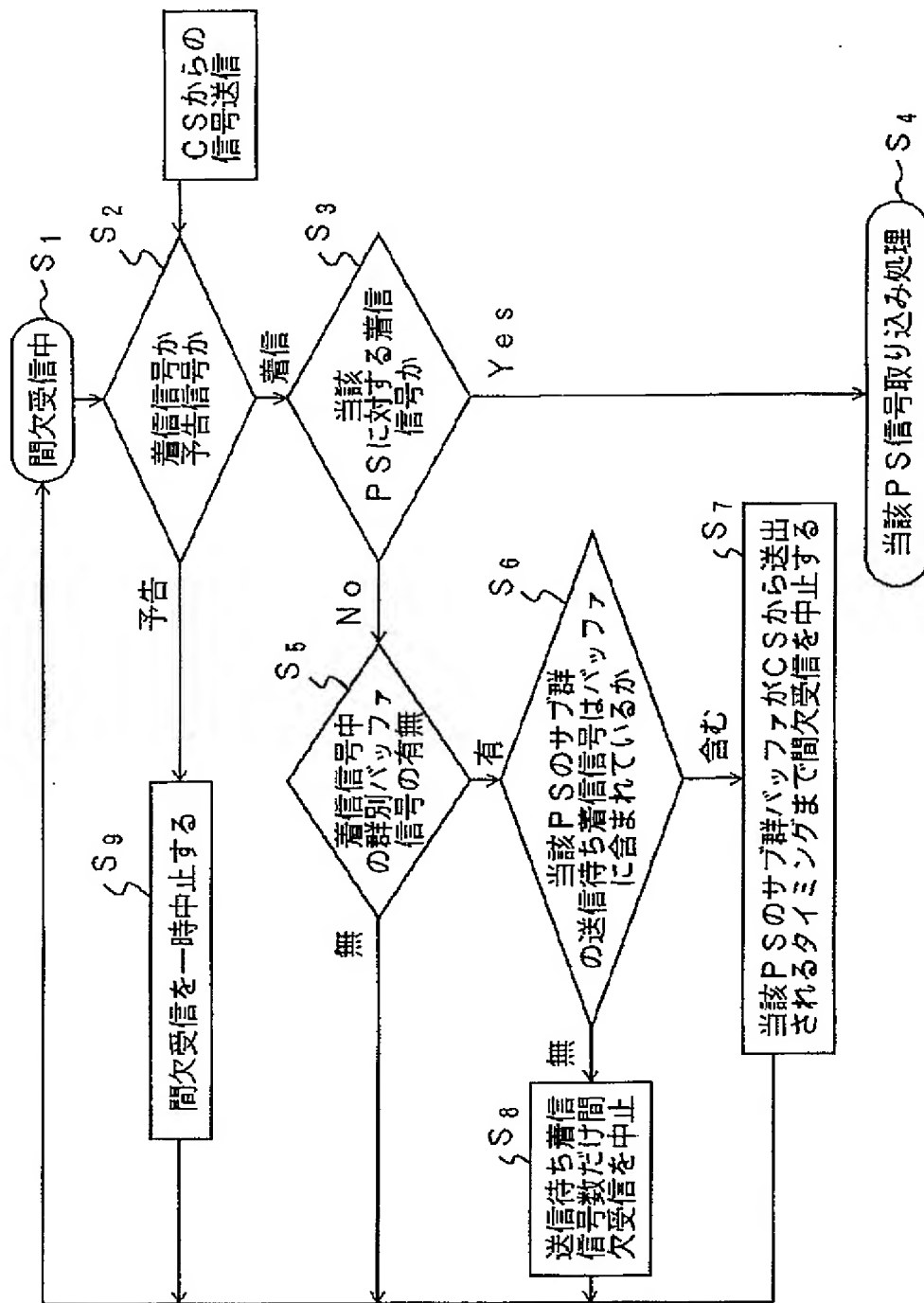


図 5

[Drawing 8]

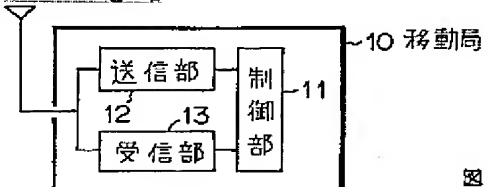


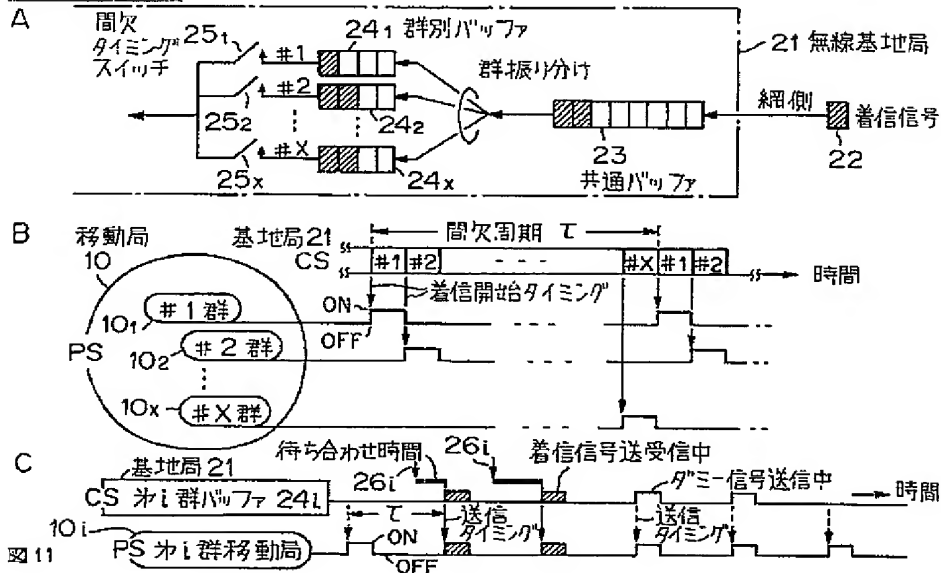
図 8

[Drawing 10]

	通電中	待ち受け中
制御部	ON	ON
送信部	ON	OFF
受信部	ON	ON

図 10

[Drawing 11]



[Translation done.]